

Faculty of Education

Lesson Plan Template

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| **Subject / Course:** Math | **TC Name:** Amy Kelland | |
| **Grade Level:** 8 | **Date:** Oct 22nd, 2010 | |
| **Topic:** Ratios and rate | **Time of Class:** 60 mins | |
| **AT Name:** Mr. S. | **Room # / Location:** 208 | |
| **1. Curriculum Expectation(s) and Goal(s) for the Lesson** | |  |
| 1. **Expectations**:  |  | | --- | | - solve problems involving proportions using concrete materials, drawings, and variables  - identify and describe real-life situations involving two quantities that are directly proportional  - solve problems involving rates | | | |
| 1. **Goal(s) for the lesson:**  |  | | --- | | - students will recognize that fractional values are determined by the value of the whole using pattern blocks  - students will calculate total value when the value of a unit is known through pattern blocks and triangle paper | | | |
| **2. Preassessment and Accommodations/Modifications** | | |
| |  |  | | --- | --- | | **Preassessment:** | **Accommodation/Modification:** *(how will you adapt your lesson?)* | | **Academic Needs:**   * One student in the class is gifted but his parents decided not to put him in a specialized class so when he gets bored, he gets distracted   **Behavioural/Social/Emotional Needs:**   * There are a couple of students that seem slightly withdrawn from math as it is not their strong subject   **Physical Needs: N/A**  **Diversity Needs: N/A** | **Academic needs:**   * Students who finish early can work on the consolidation questions on the handout. If they finish those, they may read their book until the rest of the class is ready to continue. * As the students compare their objects and learn through the manipulatives, I would circulate and help those that I know will have trouble. I may also suggest to some groups to make a smaller design to save them a bit of time if I see them struggling   **Behavioural/Social/Emotional Needs:**   * By using manipulatives, I hope the students who do not enjoy math as much will become engaged * I will also circulate to help students one on one   **Physical Needs: N/A**  **Diversity Needs: N/A** | | | |

**3. Learning Environment**

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| - The grade 8 students are at tables in groups of four, three or two at the front of the class  - Students work in pairs for the majority of the lesson  - Students will work at their desks and will share their work with others at the same table  Mr. Skelly's class.png |

**4. The Overview (Agenda) for your lesson:**

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| 1) How do our pattern blocks relate?  2) Designs of all Kinds  3) How is your design different? |

**5. Resources and Materials for your class**

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| - 5 groups of about 10 pattern blocks already divided (no tan or orange)  - small Ziploc bags for pattern blocks  - handout for each student (approx 20 copies)  - small whiteboard, markers and erasers to show students calculations  - brain teasers for students that finish early |

**6. Content, Teaching Strategies, for Lesson**

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| ***Time*** | ***Teaching or***  ***Assessment Strategy*** | ***Detailed Description*** |
| *10 min* | *Introduction* | *1) Give each pair of students a variety of about 10 pattern blocks (no squares or tan diamonds)*  *2) Ask students to work with a partner to find the fractional value of the green triangle given that the fractional value of the yellow hexagon is 1.*  *3) Next, ask them to then figure out the fractional values of a blue parallelogram and of the red trapezoid when the fractional value of the yellow hexagon is 1.*  *4) Ask volunteers to share and explain their findings. Encourage them to use Pattern Blocks to support their explanations. Tell the students that they have just determined some ratios.* |
| *25 min* | *Instruction/ Application* | *5) Explain that a ratio compares two quantities with the same units directly. If we look at an example of these trophies and the difference in their height, we can compare them directly.*  *6) Show a comparison of heights and explain we are comparing the height of the trophy 3 to trophy 4. The ratio would be 10:12. We don’t have to write in the units because they are the same for both trophies. In the same example, show that ratio can also be expressed in the same form as a fraction.*  *7) At this point it is important to note that there is a difference between ratios and fractions even though they look can look alike. The denominator of a fraction always refers to a whole, but the second term of a ratio can refer to a part. For example, if one class is ½ girls and another class is ½ girls, when the two classes go on a field trip together, it is not true that all the students are girls.*  *8) To make sure that we don’t get confused, let’s look at another example of ratios vs. Fractions. Four pennies and four quarters are thrown onto a table. What is the ratio of heads to tails for the pennies? (1:3) What is the ratio of heads to tails for the quarters? (2:2) What is the ratio of heads to tails of all the coins? (3:5)*  *9) Now we move on to rates. People find ratios and rates easy to confuse. The big difference here is that a rate is a comparison of two different quantities. You have probably heard of some well known rates such as speed (ex 40 km/h).*  *10) I’ve given you a table with some common rates you may have seen before. Go over table.*  *11) A unit rate is where we reduce one of our values in our rate to one. For example, we see signs on the road for 40 km/h. We know this is a rate because it is comparing two different units (kilometres and hours). We then can see that we are looking at 40 km in 1 hour. Because our value for hours is a one, this is considered a unit rate.*  *12) This could be very useful if we’re comparing prices so we can get the best deal. Let’s say Mr. Skelly needs to purchase some blank CDs so that he can record the AV club’s movie maker slideshows. If we go to Future Shop, we see that a spindle of 25 “Verbatim” blank CDs cost $19.99 and a spindle of 30 “Memorex” blank CDs cost $21.99. To compare the unite price of the CDs, we want to figure out the cost of 1 CD from each brand.*  *13)Write down the rates as dollar as spindle cost over amount of CDs in the spindle. So we will have: (Verbatim: 19.99/25 and Memorex 21.99/30). What do we have to do to find the unit price of the Verbatim CDs? (multiply by 1, so solve 19.99/25 = $0.7996) What do we have to do to find the unit price of the Memorex CDs? (multiply by one, so solve 21.99/30 = $0.733)*  *14) Round the two values so that they make sense as a dollar amount and then compare them directly since both rates are now in dollars/1 CD.* |
| *10 min* | *Consolidation* | *15) Have students work independently on levelled questions. If they cannot complete the worksheet in class, have them do it for homework and be early on Monday to help students who have had problems.* |

**7. Reflections: To be completed after you have taught the lesson.** (In this section, you will assess the effectiveness/ineffectiveness of your lesson and of your teaching.

**a) Effectiveness of your lesson***.*

*Include 2 or 3 lesson elements that were effective/ineffective. What went well, what could have gone better? How was the pacing of your lesson? Were your teaching strategies effective? Were all students engaged? Did the students accomplish your goal? Did your assessment strategies work?*

*What do you need to learn more about? What do you need to work on when planning your next lesson? Should you discuss something with your AT or your FA?*

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| **What was effective/ineffective about your lesson** | **How do you know?** | **What steps will you take to improve?** |
| *My lesson plan needs more higher order questioning for students* | *I don’t have any written in and they are hard to think of on the spot* | *By having a few higher order questions in my lesson, if I only have one student answering them, I can ask others how they think the first student came up with their answer* |
| *My lesson was well timed* | *I didn’t go over the time I had and the students had time to work on their worksheet in class* | *By thinking I have less time than I do and having sponges to compensate, it will allow me to use my time more effectively and spend extra time on a topic if needed* |
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**b) Effectiveness as a Teacher:**

*Include 2 or 3 comments about your effectiveness as a teacher or areas that could be improved. You could comment on your ability to manage the class, use higher order questions, your questioning technique and your ability to have the participation of all students. How effective was your oral and/or written communication? Were you able to adjust your lesson plan as required?*

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| **What was effective/ineffective about you as a teacher?** | **How do you know?** | **What steps will you take to improve?** |
| *Using language such as “like, guys and okay” too frequently* | *My faculty advisor informed me of it and I have been told this in the past* | *I will try not to use them and be sure of my terminology for the lesson I am teaching so that these words are unecessary* |
| *I need to make sure students are only speaking when they raise their hands or when others are not speaking* | *Students were speaking over each other and speaking while I was teaching* | *I will be more diligent about using independent lessons for students who cannot be quiet and need to leave the group* |
|  |  |  |

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lesson #\_\_\_\_\_: Ratios and Rates**

Ratios

1. Given that the value of the yellow hexagon is 1 whole, the fraction value of one green triangle is \_\_\_\_\_\_\_\_\_\_\_\_.
2. Given that the value of the yellow hexagon is 1 whole, the fraction value of one blue parallelogram is \_\_\_\_\_\_\_\_\_\_\_\_.
3. Given that the value of the yellow hexagon is 1 whole, the fraction value of one red trapezoid is \_\_\_\_\_\_\_\_\_\_\_\_.
4. Definition of a ratio: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. In the diagram below, we can compare the heights of the trophies.



Let’s look first at the comparison of the heights of trophy 3 to trophy 4. We see that the height of trophy 3 is 10 inches and the height of trophy 4 is 12 inches. Because we have the same units for both heights, we can write the ratio as 10:12 with no units present. We say this as 10 “to” 12. We can also write our ratio like this .

**Important! :** There is a **difference between fractions and ratios** even though they can look alike. The denominator (bottom number) of a fraction refers to a whole, whereas the second term of a ration can refer to another part. One **similarity between fractions and ratios** is that they stay the same if both parts are multiplied by the same number ( and 6:12 = 1:2).

 For example, if one class is ½ girls and another class is ½ girls, when the two classes go on a field trip together, it is not true that all students on the trip are girls.

1. One more example to show that ratios are NOT fractions:

C:\Program Files\Microsoft Office\MEDIA\OFFICE12\Bullets\BD21421_.gif

C:\Program Files\Microsoft Office\MEDIA\OFFICE12\Bullets\BD21421_.gif

C:\Program Files\Microsoft Office\MEDIA\OFFICE12\Bullets\BD21421_.gif

Let’s say that 4 pennies and 4 quarters were thrown onto a table and landed as you see above.

1. What is the **ratio** of heads to tails for the pennies?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What **fraction** is represented by heads of the pennies out of all the pennies?\_\_\_\_\_\_\_
3. What is the **ratio** of head to tails for all the coins?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What **fraction** is represented by tails of all the coins out of all the coins?\_\_\_\_\_\_\_\_\_\_

Rates

1. Definition of rate:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Some common rates you may know:

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| --- | --- |
| **Situation** | **Rate** |
| You type 134 words in 5 minutes | Typing rate = |
| You parents car travels 260 kilometres using 7.3 gallons of gasoline | Rate of gas consumption = |
| You run a 100-metre race in 12.4 seconds | Speed = |

A **unit rate** is when we reduce one of the values in our rate to 1. For example, 40 km/h. We are still comparing kilometres to hours but we are comparing 40 km to **1** hour. This can be very useful when comparing prices at a store.

1. Let’s say Mr. Skelly needs to purchase some blank CDs so that he can record the AV club’s movie maker slideshows. He goes to *Future Shop* and finds the following deals on brand name blank CDs.

|  |  |  |
| --- | --- | --- |
| **Future Shop prices on blank CD spindles** | | |
| **Brand** | **# of CDs per spindle** | **Price in dollars** |
| *Verbatim* | 25 | 19.99 |
| *Memorex* | 30 | 21.99 |

To compare the unite price of the CDs, we want to figure out the cost of 1 CD from each brand.

Cost of 1 *Verbatim* CD:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cost of 1 Memorex CD:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which CD spindle is the better deal?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Questions for ratios and rates (please use G.O.O.S.E. paper if you need more room):

Level 1 Questions:

Calculate the missing terms:

a) 3:7 = 12:\_\_\_\_ b) \_\_\_:2:7 = 7:14:\_\_\_\_

Calculate the unit rate of the following:

c) $136.00 for 17 hours of lawn mowing d)

Level 2 Questions:

Determine whether the following are ratios or rates and explain your answer:

a)100 km/h c) 7 fiction books to 10 non-fiction books

b) d)

Level 3 Question:

The following chart is printed on a package of cookie mix. Marina wants to make six dozen cookies for the school bake sale. How much mix and milk does she need?

|  |  |  |
| --- | --- | --- |
| Number of cookies | Amount of mix | Amount of milk |
| 24 | 2 cups | 1 cups |

Level 4 Question:

Which two out of the following three mathematical tools, fractions, rate and ratio, are most alike? Explain how you determined your answer.

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